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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
09/547,561	04/12/00	MATHIEU G	003401.P098

EXAMINER	
GILMAN, A	
ART UNIT	**PAPER NUMBER**
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Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary	Application No. 09/547,561	Applicant(s) MATHIEU ET AL.	
	Examiner Alexander Gilman	Art Unit 2833	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on *08 August 2001* .

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☐ Claim(s) *1-82* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☐ Claim(s) *1-82* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. Claims 1-6 are rejected under 35 U.S.C. 102(e) as being anticipated by Chen et al.

With regard to claims 1 - 3, Chen et al (US Pat. No. 6,150,186) disclose an interconnection element directly contacting a semiconductor device, the interconnection element comprising:

a first element material (204) adapted to be coupled to a substrate; and

a second element material (206) coupled to the first element material;

wherein upon on transformation a shape of interconnection material is modified (Abstract, lines 10-14) .

With regard to claim 4, Chen et al disclose that the transformable property is such that a first volume is adapted to be transformed to a different second volume (col. 9, lines 55-59).

With regard to claims 5, Chen et al et al disclose that the second element material (206) overlies the first one (Fig 2b)

With regard to claim 6, Chen et al disclose that a transformation of the first and second material element is a result of exposing the second element to heat (col. 10, lines 34-36)

2. Claims 1- 6, 8-11, 14, 15, 18- 28, 30-32, 35, 38- 44, 48- 51, 55-59, 61-63, 66, 69- 79 are rejected under 35 U.S.C. 102(b) as being anticipated by Smith et al.

With regard to claims 1-3, 8, 22, 24, 30, 44, 48, 51, 55, 61, 75, 76, and 79, Smith et al (US Pat. 5,613,861) disclose (Fig. 6) a system comprising :

a first substrate (14) with a plurality of first contact nodes (13) formed on the first substrate and a plurality of free-standing resilient interconnection elements (15) electrically contacts a corresponding a corresponding the contact nodes;

a second substrate (101) having a plurality of second contact nodes (3),

wherein the interconnection element (15) comprises:

a first element material adapted to be coupled to a substrate, and

a second element material adapted to be coupled to the first element material, (col. 4, lines 42-44); and one of the first element material and the second element material comprises a material having transformable property such that upon transformation, a shape of the interconnection element is irreversibly modified (col.5, lines 3-8),

wherein the interconnection element has a portion thereof which is capable to a first position to contact with one of second contact nodes.

With regard to claims 4, 25, and 56, Smith et al disclose that the transformable property is such that a first volume is adapted to be transformed to a different second volume.

With regard to claims 5, 27, and 58, Smith et al disclose that the second element material overlies the first (for example, considering the first element as a non-conductive element, according to col. 4, lines 42-43).

With regard to claims 6, 20, 28, 40, 59, and 71, Smith et al disclose that a transformation of the first and second material element is a result of exposing the first and/or second element to heat (col. 6, lines 36-39, specifically - the thermal evaporation).

With regard to claims 9, 11, 31, and 62, Smith et al disclose the second element is introduced by plating and more specifically electroless plating (col. 6, lines 36-39 and col. 8, lines 61-62).

With regard to claims 10, 32, and 63, Smith et al disclose the second element is introduced by sputtering (col. 6, lines 39-40).

With regard to claims 14, 15, 35, and 66, Smith et al disclose the second element comprises nickel or nickel alloy (col. 4, lines 44-46).

With regard to claims 18, 38, and 69, Smith et al disclose that transformable property is a stress and transformation reduces the magnitude of the stress of the material (col. 5, lines 19-21).

With regard to claims 19, 21, 39, 41, 70, and 72, Smith et al disclose that the second element material tensile and compressive stress and a deformation is a response to these stresses (col. 5, lines 11-21).

With regard to claim 23, Smith et al (US Pat. 5,613,861) disclose a plurality of conductive signal lines associated with the substrate and the base of the interconnection element electrically contacts a corresponding one of the signal lines and (col. 4, lines 51-53).

With regard to claim 26 and 57, Smith et al disclose (Fig. 10-13) the free portion of the interconnection element material is initially fixed to the substrate (Fig. 11) and when the free portion is released from the substrate, the free portion is adapted to be biased away (col. 8, lines 43-45; Fig. 12).

With regard to claims 42, 43, 73, and 74 Smith et al disclose (Fig. 28).that the interconnection elements are coupled to more than one surface of the substrate and the first and the second contact points coupled through the re-distribution line and used as a part of a wafer-level test assembly.

With regard to claims 46, 49, 77, and 78, Smith et al disclose that the substrate comprises a component of a probe card (Fig. 29)

With regard to claim 50, Smith et al disclose the assembly is a part of a wafer-level test assembly (Fig. 26).

Claim Rejections - 35 USC § 103

1. Claims 7, 29, 34, 60, and 65 are rejected under 35 U.S.C. 103(a) as being unpatentable over Smith et al.

Smith et al, respectively disclose all of the limitations except for:

transformation comprises at least 90 percent of transformable volume change of the second element material (claims 7, 29, 60);

the spring material, coupled to the second element material, comprising at least about 90 percent of the interconnection element. (claim 34 and 65).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to discover the claimed quantitative characteristics of the transformability volume and percent of spring material in the interconnection element, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller, 105 USPQ 233.*

2. Claims 12, 13, 33, and 64 are rejected under 35 U.S.C. 103(a) as being unpatentable over Smith et al in view of Eldridge et al.

Smith et al disclose all of the limitations except for the first element material comprising palladium or its alloy.

Eldridge et al (US Pat. No. 5,832,601) disclose the first element material comprising palladium or its alloy (col. 14, lines 6-10).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to provide the Smith et al interconnection element comprising palladium or its alloy, as taught by Eldridge et al, as an alternative material for the first element.

3. Claims 16, 17, 37, and 68 are rejected under 35 U.S.C. 103(a) as being unpatentable over Smith et al in view of Faraci et al.

Smith et al disclose all of the limitations except for the second element material comprising a shape memory alloy

Faraci et al (US Pat. No. 5,810,609) disclose the second element material comprising a shape memory alloy (col. 14, lines 6-10).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to provide the Smith et al interconnection element comprising a shape memory alloy, as taught by, Faraci et al, to improve the Smith et al interconnection element elastic qualities..

4. Claims 34, 36, 47, 52-54, 65, 67, and 80-82 are rejected under 35 U.S.C. 103(a) as being unpatentable over Smith et al in view of Dozier II et al.

With regard to claims 34 and 65, Smith et al disclose all of the limitations except for a spring material coupled to the second element material.

Dozier II et al (US Pat. NO. 5,772,451) disclose (Fig. 2A) a spring material coupled to the second element material (col. 15, lines 44-50).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to provide the Smith et al second element with the spring material coupled to the second element material, as taught by Dozier II et al, to improve the Smith et al interconnection element elastic qualities.

With regard to claim 36 and 67, Smith et al disclose (Fig. 13) a contact material (19) adjacent a surface of the spring material (col. 8, lines 61, 62).

With regard to claim 47, Smith et al disclose all of the limitations except for the substrate comprising a socket for releasably connecting the electronic assembly to an electronic component.

Dozier II et al (US Pat. NO. 5,772,451) disclose (Fig. 3) the substrate (310) comprising a socket for releasably connecting the electronic assembly to an electronic component.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to provide the Smith et al substrate comprising a socket for releasably connecting the electronic assembly to an electronic component, as taught by Dozier II et al, to utilize the interconnection elements for LGA-sockets.

With regard to claims 52 and 80, Dozier II et al disclose (Fig. 3) the second contact nodes (308) comprise external connection points.

With regard to claims 53, 54, 81, and 82, Dozier II et al disclose (Fig. 3):

the third substrate (302) and a plurality of third contact nodes (306) (claims 53 and 81);

a stop structure (336) disposed on the first substrate (claims 54 and 82).

5. Claim 45 is rejected under 35 U.S.C. 103(a) as being unpatentable over Smith et al in view of Khandros et al.

Smith et al disclose all of the limitations except for the substrate comprising an interposer.

Khandros et al (US Pat. NO. 5,994,152) disclose (col. 14, lines 24-34) the substrate comprising an interposer

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to provide the Smith et al substrate comprising an interposer, as taught by Khandros et al, to utilize the interconnection elements for interposers.

Response to Arguments

Applicant's arguments filed 08/08/2001 have been fully considered but they are not persuasive.

With regard to claims 1-6, Applicants argue that the prior art (Chen et al) do not disclose transforming the

interconnection element as whole, but modifying one of component only. However, claim 1 does not claim transformation of the interconnection element as whole. It claims that "... one of the first element material and the second element material having a transformable property ...". Since Chen et al disclose the transformation which is "...just enough to reorganize the material to the new desired form" (Abstract, lines 9-10), the Office action rejection based on the Chen et al seems to be proper.

With regard to claims 1-6, 8-11, 14,15, 18-28, 30-32, 35, 38-44, 48-51, 55-59, 61-63, 66, and 69-72, Applicants admit that the material of the prior art (Smith et al) "...may change shape ..." (Amendment filed 08/08/2001, p. 6 ,lines 12-13), but argue that the stress-gradient is responsible for the shape of the spring contact.

Claim 1 claims " ... a material having a transformable property, such that upon transformation, such that upon transformation a shape of the interconnection material is modified".

The stress gradient is not a property of material, it is a external factor causing the shape modification. If the Smith et al material "may change shape", that material has "a transformable property". Hence, the Smith et al reference seems to be proper.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alexander Gilman whose telephone number is (703) 305-847. The examiner can normally be reached on Monday-Friday, 10:00 a.m - 7:30 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Paula A. Bradley can be reached on (703) 308-2319. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7322 for regular communications and (703) 308-7322 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-4900.

AG
October 10, 2001

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